Disaster Prevention and Management

Redefining disaster: need for managing accidents as disasters

Piyoosh Rautela
Department of Disaster Management, Disaster Mitigation and Management Centre, Dehradun, India

Disaster Prevention and Management, Vol. 15 No. 5, 2006,

Disaster Prevention and Management, An International Journal, sets out to advance the available knowledge in the fields of disaster prevention and management and to act as an integrative agent for extant methodologies and activities relating to disaster emergency and crisis management. Publishing high quality, refereed papers, the journal supports the exchange of ideas, experience and practice between academics, practitioners, and policy-makers.

ISSN 0965-3562

Published in association with the Disaster Prevention and Limitation Unit, University of Bradford

Certificate number .....1985/09.....

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Disaster Prevention and Management: An International Journal
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Journal information
www.emeraldinsight.com/dpm.htm
Table of contents
www.emeraldinsight.com/0965-3562.htm

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Printed by Printhaus Group Ltd, Scirocco Close,
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Redefining disaster: need for managing accidents as disasters

Piyoosh Rautela
Department of Disaster Management, Disaster Mitigation and Management Centre, Dehradun, India

Abstract

Purpose – The cumulative impact of accidents not considered as disasters far surpasses the impact of disasters. Accidents taking toll of human lives and economy are often underreported and go unnoticed and the victims of these incidences are also ill compensated. It is therefore necessary to pay adequate attention to accidents and formulate appropriate policies for giving equal treatment to the victims of these events and also to make efforts for mitigating these. This paper aims to discuss this.

Design/methodology/approach – The paper discusses the impact of accidents and attempts to assert that these are a cause of major concern. The database of the disasters (EM-DAT) of Center for Research on the Epidemiology of Disasters (CRED), Belgium has been utilised for ascertaining the toll of disasters, while for assessing the cumulative toll of the accidents and disasters database available at departmental web sites (Department of Road Transport and Highways, Ministry of Shipping, Road Transport and Highways, Government of India (www.morth.nic.in) and Railway Ministry, Government of India (www.indianrailways.gov.in) together with some other web sites have been used. The two databases have been correlated to establish that the cumulative toll is far more than what is generally perceived to be the toll of the disasters.

Findings – Based on the correlation of one event each under the category of natural and man made disasters (landslides, transport accidents) it is concluded that these correlations establish that the toll of accidents is many times more than the disaster events and there exists a pressing need to pay adequate attention towards managing accidents that take heavy toll of the global resources.

Research limitations/implications – At present there exists no formal and comprehensive database recording the toll of accidents and the study is based on the database compiled from different sources. The paper establishes beyond doubt that the magnitude of the toll of accidents is far more than that of disasters and there exists pressing need for managing accidents.

Practical implications – This paper would bring forth the importance of managing accidents before the policy makers and initiate advocacy for putting in more resources for managing these events. In the long run the victims would not be differentiated on the basis of the magnitude of the incidents they have faced.

Originality/value – The paper shows the importance of managing major accidents and provides guidance for appropriate changes to be made.

Keywords Accidents, India, Disasters, Accident and emergency, Landslides

Paper type General review

The author is grateful to Dr R.K. Pande, Executive Director, Disaster Mitigation and Management Centre (DMMC) of the State Government of Uttaranchal for constant encouragement to pursue research in the field of Disaster Management (DM) apart from providing opportunities of field exposure. Shri N.S. Napalchyal, Principal Secretary (DM) and Shri Rakesh Sharma, Secretary (DM), Government of Uttaranchal are acknowledged for providing necessary motivation. The support and cooperation from the colleagues at DMMC, specially Ravish Sharma who suggested important amendments in the original text after painstakingly going through the raw text is acknowledged.

Disaster Prevention and Management
Vol. 15 No. 5, 2006
pp. 799-809

0965-3562
DOI 10.1108/09653560610712748

Disasters: No stranger to humanity

Disaster is not a new phenomenon that the world is witnessing today and the human race, from its very appearance on this planet has faced the fury of natural hazards and has through his superior acumen devised means of minimising and warding off the impact of these events. These are often reflected in the socio-cultural and religio-magical practices of the little tradition of the indigenous people even today. In the initial phases of his appearance on planet earth some 1,30,000 years ago the prime concerns for the survival of this relatively less specialized species (*Homo sapiens*) revolved round ensuring safety from the vagaries of nature and safety from the predators. The human race, however, managed to overcome the handicap of being unspecialized by collective efforts (replacing mutual strife by cooperation), devising means of passing on accumulated knowledge from one to other generation (language became the vehicle of knowledge transfer over generations) and utilizing the natural resources as tools and implements.

For a long time even after the growth of civilisations food shortage emanating from pest infestation and crop failure (due to extreme climatic events) resulting in famine and outbreak of deadly diseases remained the prime concern of the humans apart from the fury of various natural hazards. The data on disasters show that drought, epidemic, famine and flood have been the major causes of human deaths the world over till the later half of the previous century.

With the advancement of scientific and technical knowledge a large number of erstwhile deadly diseases (plague, smallpox, malaria and the others) resulting in mass toll have been written off as things of the bygone days though emergence of new and more deadly diseases (AIDS, hepatitis, encephalitis and the others) is a cause of concern for the humanity today. Emergence of welfare states, globalisation, increasing mutual cooperation together with efficient transport systems have ruled out possibility of crop failures in a region resulting in famine like situation.

Despite technological leaps and better understanding of the natural processes human ingenuity is far from ruling out the occurrence of disasters on this planet. Despite best preparations and early warning systems tsunamis, earthquakes, cyclones, hurricanes, volcanic eruptions, floods, avalanches and landslides keep taking the human populations by surprise. Realising the handicap imposed upon human capabilities the focus of human initiatives to minimise human miseries at the face of disasters has been shifted to managing these rather than trying to prevent these all together.

The data on disasters suggests that the economic losses resulting from disasters the world over are on the rise and the human toll though seemingly showing a continuously reducing trend (Figure 1) is primarily owed to highly reduced toll of drought, epidemic and famine and non availability of the data on the toll of accidents.

As against the global database the situation in India is somewhat peculiar. The death toll due to disasters is not as high as witnessed in the 1960s but the toll has been rising constantly since that time and the situation is alarming (Figure 2). Apart from the man made disasters the toll of slides, flood and extreme temperature events show a clear upward trend. Non-availability of the resources for preparedness and mitigation together with the lack of political will are the primary causes of this abnormal trend.

This rising toll is often cited as a reason for the country lagging behind in the race of development (disaster - poverty syndrome). Recurring disasters take toll of the scare resources and the poverty levels rise which further increase the vulnerability and exposure levels of the masses and lead to still bigger loss of resources during the disaster that follows.

Database on the disasters is crucial for evaluating the losses caused by these to the economy so as to plan effective and efficient mitigative measures and make available adequate funds for implementing appropriate policies. It is, however, worth remembering that this toll is just the tip of the iceberg and the events taking human and economic toll but not classed under the category of disasters take a much higher toll and any plan based upon the data that does not represent the true picture is bound to be a failure. For the planning process to be successful and for tackling the problem holistically it is a must to prepare a comprehensive database on the cumulative toll of

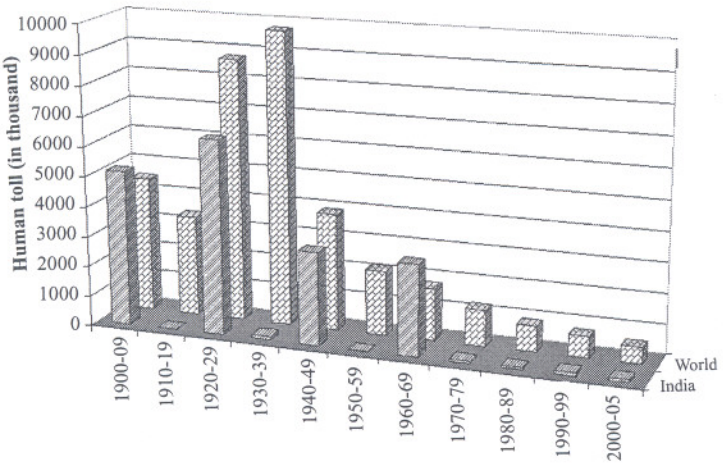

Figure 1.
Diagram showing decadal reduction in the human death toll the world over as also in India due to disasters (both natural and man made). Data source EM-DAT of CRED

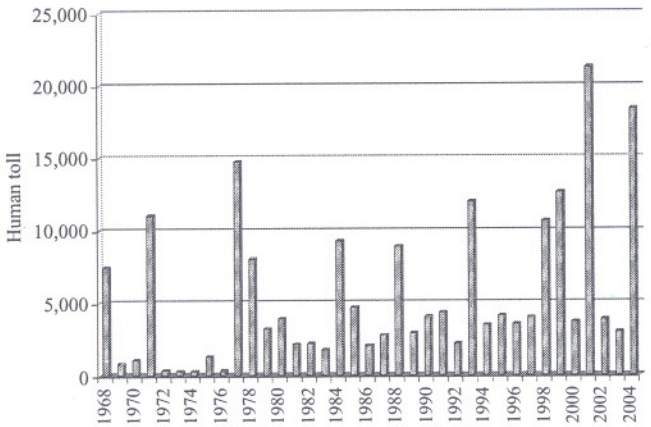

Figure 2.
Diagram showing increasing human death toll trend in India due to disasters (both natural and man made) in the recent past. Data source EM-DAT of CRED

(3) Miscellaneous accidents: collapses of domestic/non-industrial structures; explosions; fires.

The EM-DAT database of CRED is exhaustive and voluminous but the effort of this communication is to impress upon the crude fact that the real situation is far more grave and the accidents not qualifying to enter into the EM-DAT take far more severe toll of the world economy. The available database of some specific disasters of India together with those for the state of Uttaranchal have been utilised for putting this fact across. It therefore becomes necessary to change the definition of disaster to accommodate accidents so as to have a holistic picture of the losses incurred and to mobilize appropriate resources for managing these incidences.

The data source

In the present communication data on the human toll in one disaster each falling under natural and man made category, i.e. slides and transport accidents from India and the state of Uttaranchal are compared with the toll as recorded in the CRED database (EM-DAT). The toll as reported by the EM-DAT data represents the toll of the events that qualify under the definition of disasters put forth by CRED while the data from India as also the state of Uttaranchal is taken as representative of the cumulative human toll of disasters and accidents.

The database of India for surface and railway accidents has been taken from the web sites of the Department of Road Transport and Highways, Ministry of Shipping, Road Transport and Highways, Government of India (www.morth.nic.in) and Railway Ministry, Government of India (www.indianrailways.gov.in) as also other web sites (www.disaster-management.net/train_acc_india.htm). The data for aviation accidents has been compiled from the web site (www.disaster-management.net/airpl_acc_index.htm) while the data for maritime accidents could not be compiled. The cumulative transport accident data (people killed in transport accidents) has been compiled for the period 1981-2003 for road transport, railway and aviation accidents in India. This data is subsequently compared with the data as recorded for those years by the CRED database (EM-DAT).

The data for the toll of human lives by slides could not be compiled for the entire country and the available data of the state of Uttaranchal for the previous three years (2002-2004) is compared with CRED data of the same period for India. This data was collected by Disaster Mitigation and Management Centre of the State Government of Uttaranchal over the previous years. It might be worth noting that the State of Uttaranchal accounts for only 1.6 percent of the total geographical area of India and 8.6 percent of the geographical area of all the eleven Himalayan states (Arunanchal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Uttaranchal) that face major threat of landslides.

Traffic accident and landslide scenario in India and Uttaranchal

As per the available data for the year 2003, India has a total road length of 24,56,647 kilometers of which 14,20,498 kilometers (57.8 percent) is surfaced. There are 6,70,33,000 registered vehicles on road and thus 47 vehicles per kilometer of surfaced road length (source: Department of Road Transport and Highways, Ministry of Shipping, Road Transport and Highways, Government of India (www.morth.nic.in)).

India has at the same time fairly vast network of railway lines measuring total of 1,44,320 kilometers. There are more than 6,896 operating railway stations in India. Though the vehicular density in the country is moderate higher death toll due to traffic accidents is attributed to:

- poor road conditions;
- poor enforcement of regulations ensuring road worthiness of the vehicles;
- lack of awareness regarding traffic rules together with blatant disregard to traffic rules; and
- high levels of negligence.

The railway accidents are attributed to human negligence and failure of the signalling devices. India does not have significant air traffic and the aviation accidents are comparatively few.

The Republic of India covers geographical area of 32,87,263 square kilometers and shows a wide variety of climatic conditions ranging from subtropical to alpine. Having extremes of climates, physiographic and geological conditions the nation is affected by a wide variety of natural disasters of which earthquake, cyclone, drought, flood, tsunami and landslides are the major ones. Large number of people suffer at the hands of these disasters almost every year and these seriously affect the pace of development and economic growth.

After the 2001 Bhuj Earthquake no part of the nation is considered safe from seismic vulnerability and the entire Himalayan terrain is regarded as being highly susceptible to future seismic catastrophes. Subduction and the eventual collision of the alien plates (Indian and Eurasian) have caused extensive shearing, folding, faulting, and fracturing of the rocks. Ongoing north-northeastward drift of the Indian plate makes this terrain highly prone to earthquakes.

Uttaranchal which is essentially a Himalayan state and highly vulnerable to seismicity. Four of the 13 districts of the state (Pithoragarh, Chamoli, Rudraprayag and Bageshwar) fall in Zone V of the Seismic Hazard Map of India (representing damage risk of > IX on MSK scale) while the other five (Uttarkashi, Tehri Garhwal, Pauri Garhwal, Almora and Champawat) fall partially in Zone V and partially in Zone IV (representing damage risk of VIII on MSK scale) and the rest fall totally in Zone IV. In the past the state has been visited by two major earthquakes with their epicenters at Uttarkashi (1991) and Chamoli (1999) that took toll of 7,000 and 101 people, respectively.

High relative relief and natural weakness of the rocks makes the Himalayan region prone to mass wastage processes; particularly so in the vicinity of major tectonic discontinuities and shear zones and often during the monsoon season when enhanced pore water pressure facilitates down slope movement. The data pertaining to all the Himalayan states could, however, not be assessed and the one from the State of Uttaranchal is being used for present correlations. The state of Uttaranchal (representing 8.6 percent area of the 11 Himalayan states of India) is routinely affected by landslides that take toll of human lives and infrastructure (Table I) with Nainital (1880), Malpa (1998) and Okhimath (1998) representing the major ones that took toll of 151, 230 and 101 human lives. There are, however, a large number of smaller events that routinely take large toll of human lives, property and infrastructure facilities.

Year	Event
1816	Pauri landslide
1842	Joshimath landslide
1857	Massive landslide blocked the flow of the Mandakini river
1868	Landslide upstream of Chamoli blocked Alaknanda river: Swept two villages and killed 70 pilgrims
1880	Landslide in Nainital town: massive destruction killing 151 persons
1893	Landslide blocked Birahi Ganga and formed an artificial lake near Gohna village in Garhwal Himalaya
1894	Breach of Gohna lake causing Birahi disaster in Alaknanda valley
1906	Helang landslide
1945	Patalganga landslide
1963	Nainital landslide
1963	Kaliasaur landslide
1965	Karnaprayag landslide
1970	Landslides formed an artificial lake in the upper catchment of Alaknanda river: affected 101 villages, 25 buses of pilgrims were wept away, 55 persons and 142 animals perished District headquarter of Chamoli district at Chamoli devastated and subsequently shifted to Gopeshwar
1979	Okhimath landslide: 39 persons died
1981	Uttarkashi-Kedarghati landslide
1986	Landslides at Jakholi in Tehri Garhwal and at Devaldhar in Chamoli: 32 human lives lost
1991	Gopeshwar Landslide: 36 persons died
1996	Bhimtala landslide
1998	Massive landslides in Okhimath area formed an artificial lake blocking the course of Madhyamaheshwar river (tributary of Mandakini): 109 people dead, 1,908 families from 29 villages affected and 820 houses damaged
1998	Malpa landslide along river Kali on Indo-Nepal border in Pithoragarh district: Wiped out Malpa village killing around 300 people
2001	Phata and Byung Gad landslides: around 21 persons killed and several houses damaged
2001	Gohna landslide: seven persons rendered dead
2002	Landslides at Budhakedar: 28 persons died together with 99 cattle
2002	Khetgaon landslide: five persons died together with 26 cattle
2002	Bhatwari – Dunda Landslides: five persons died together with 26 cattle
2003	Didihat landslide: four persons killed and ten animals perished
2003	Gadoli landslide: four persons died
2003	Uttarkashi landslide: landslide at the urban centre devastated massive infrastructure though there were no casualties
2004	Amparav landslide: three persons died
2004	Sundardgunga landslide: five persons up in the mountains for tracking died
2004	Lambagar landslide: seven persons died together with another nine missing
2004	Kalindi Parvat landslide in Uttarkashi: six persons died
2005	Ramolsari Landslide: this pre-monsoonal landslide caused massive damage to agricultural fields though there were no human casualties
2005	Govindghat landslide in Chamoli: killed 11 persons and caused heavy damage to property
2005	Agastyamuni landslide in Rudraprayag: landslide along a seasonal stream caused heavy loss of infrastructure at the township killing four persons

Table I.
List of major landslides in Uttaranchal

Correlating accidents with disasters

With industrialisation the rates of technological disasters has increased the world over and the transport accident data of India for the period 1981-2003 has been correlated with the CRED database (Table II) with an assumption that the discrepancy in the two

Table II.
Correlation of transport accident death data of India (1981-2003)

	Human deaths as a result of transport accidents National figures						
Year	EM-DAT (CRED)	Road accidents	Railway accidents	Aviation accidents	Total	Not covered by CRED	Covered by CRED (percent)
1981	268	28,400	568	0	28,968	28,700	0.9
1982	0	30,700	0	0	30,700	30,700	0
1983	51	32,800	0	0	32,800	32,749	0.2
1984	578	35,100	0	0	35,100	34,522	1.7
1985	312	39,200	88	0	39,288	38,976	0.8
1986	784	40,000	102	0	40,102	39,318	2.0
1987	651	44,400	53	0	44,453	43,802	1.5
1988	1,432	46,600	107	0	46,707	45,275	3.1
1989	586	50,700	230	0	50,930	50,344	1.2
1990	1,109	54,100	206	90	54,396	53,287	2.0
1991	564	56,400	30	0	56,430	55,866	1.0
1992	251	57,200	101	0	57,301	57,050	0.4
1993	601	60,700	71	0	60,771	60,170	1.0
1994	702	64,000	35	9	64,044	63,342	1.1
1995	745	70,600	525	0	71,125	70,380	1.1
1996	1,089	74,600	153	369	75,122	74,033	1.5
1997	1,096	77,000	126	0	77,126	76,030	1.4
1998	1,164	79,900	274	0	80,174	79,010	1.5
1999	996	82,000	426	21	82,447	81,451	1.2
2000	363	78,911	82	51	79,044	78,681	0.5
2001	288	80,888	100	0	80,988	80,700	0.4
2002	771	84,674	133	0	84,807	84,036	0.9
2003	573	83,733	15	0	83,748	83,175	0.7

data sets is due to a large number of accidents not qualifying to be recorded in the CRED database.

This correlation brings forth the fact that on an average only 1.1 percent (3.1 percent being the maximum in the year 1988) of the persons killed in various traffic accidents in India qualify as being recorded under the category of disasters related to traffic accidents. Of traffic related causalities in India, 98.9 percent are therefore accounted for by accidents that are not accounted for as being caused by transport related disasters.

The data on slides is not representative of the entire country and the data from the State of Uttaranchal (representing only 1.6 percent of the country's area and 8.6 percent of the area of the 11 Himalayan states) is being correlated with the CRED database for the previous three years (Table III). Only 38.5 percent of the casualties for the year 2003 are accounted for in the database while there exist no entry for the entire country under this category for the years 2001 and 2004 during which the state of Uttaranchal alone has recorded 38 and 70 human casualties, respectively. That is suggestive of the fact that an overwhelmingly large number of events (accidents) are never recorded as disaster.

The foregoing correlation is not to question the creditability of any data set but to bring forth the assertion that accidents not qualifying under the present definition of disaster take much greater a toll of world economy than is generally perceived. Detailed planning and enforcement related exercises have to be undertaken at various levels all over the world for reducing this loss of resources. It is therefore a must to have a clear picture of the exact toll and for which a change in the definition of disaster is required.

Human miseries and the road ahead

The foregoing correlations suggest that the accidents that fail to qualify as being disaster events (because of their lesser magnitude of impact) take mammoth cumulative toll of human lives and economy as compared to the toll of disasters (as large as 99 times in case of traffic related disasters) that are a cause of concern for everybody. A large number of human deaths in such lesser events (accidents) are thus not considered as being caused by disaster events.

This misinterpretation of facts on the basis of share magnitude of events is often responsible for the lack of formal support for the accident victims from various agencies for relief, rehabilitation and others. This amounts to negative discrimination of accident victims that no constitution of the civilized world permits. This lack of support adds to the misery, pain, panic and trauma of the victims who is gravely hurt by administrative and social apathy.

The responsibility of the administration in case of accident victims ends with extending the compensation as per the government norms and even the

Year	Human deaths due to landslide EM-DAT (CRED)	Uttaranchal	Percent accounted by CRED
2002	0	38	0
2003	25	65	38.5
2004	0	70	0

Table III.
Correlation of landslide induced death data of Uttaranchal (2002-2004)

Non-Governmental Organisations do not come forward to take due care of these victims. There is at the same time no aid from outside available to the victims of these lesser known events.

The world hardly comes to know of these victims as these accidents are never reported. Lack of consolidated database on these events is also responsible for the world being unaware of the impact of these events. These incidences (accidents) are most of the times not adequately reported even by the local media as they carry little news value (unless these involve some celebrity) and are bypassed as just another incidence causing death of some miserable human beings. Under reporting of these events is a reality and the authors admit that even the figures quoted for the analysis might be less than the actual fatalities.

Owing to the lack of a detailed and comprehensive database on the exact toll of human lives and economy in these accidents it becomes hard to appreciate their quantifiable impact on the national and global resources. It is therefore not surprising to note that not many agencies are working for the cause of mitigating accidents despite their causing mammoth human deaths and economic losses where as huge funds are being pumped for managing larger disaster events that have a very low frequency but with concentrated losses that have a great visual appeal to everyone.

At present, a large number of programs are going on for disaster risk management the world over but the major focus of these programs is on larger disaster events. The smaller events that are much frequent and at the same time causing many more human deaths are not being addressed by these programs. It is perceived that the lack of database on these events and the assessment of their exact impact is the primary reason for these programs ignoring these smaller events (accidents); lack of data is resulting in appreciation of the fact that the real impact of these lesser events is many folds larger than the disasters being addressed by these programs.

First and foremost a serious exercise has to be undertaken at all levels for the creation of a comprehensive and exhaustive database of all accidents causing human death and leading to economic losses. This task has to be initiated at the earliest possible so as to evaluate the exact quantifiable impact of these events (accidents). This would be the first step for making the post disaster affairs secular (non discriminatory) by:

- initiating advocacy forum for changing the disaster definition to cover accidents;
- bringing forth policy changes for compensating the accident victims at par with disaster victims;
- covering accidents under disaster risk management and other welfare programs aimed at managing disasters;
- pressurizing the planners for providing adequate funds for managing these accidents; and
- bringing forth appropriate changes in the techno-legal regime for minimizing the impact of these events.

This would initiate a process whereby the victims of lesser events (accidents) would not be discriminated on the basis of the magnitude of the disaster they have braved and there would be uniformity in compensation and rehabilitation packages.

Realising the magnitude of the toll taken by these lesser events even the government machinery would be forced to enact mitigative policies for reducing the growing toll of these events. This would amount to saving of mammoth and scare world resources which could subsequently be diverted for the cause of human welfare the world over.

Corresponding author
Piyoosh Rautela can be contacted at: piyooshrautela@hotmail.com

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